

Zero Retries issue 0228 2025-11-14

Zero Retries is an independent newsletter promoting technological innovation in and adjacent to Amateur Radio, and Amateur Radio as (literally) a license to experiment with and learn about radio technology. Radios are computers - with antennas! Now in its fifth year of publication, with ~~3200+~~ 3300+ subscribers.

About Zero Retries

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Paid Subscribers Update

My thanks to **Edward Mitchell KF7VY** for *renewing* as an **Annual Paid Subscriber** to Zero Retries this past week (3rd year)!

My thanks to **Florian Lengyel WM2D** for *renewing* as an **Annual Paid Subscriber** to Zero Retries this past week (3rd year)!

My thanks to **Jon Pearce WB2MNF** for *renewing* as an **Annual Paid Subscriber** to Zero Retries this past week (3rd year)!

My thanks to **David Whitham K3BQ** for *renewing* as an **Annual Paid Subscriber** to Zero Retries this past week (2nd year)!

My thanks to **Prefers to Remain Anonymous 56** for *renewing* as an **Annual Paid Subscriber** to Zero Retries this past week (2nd year)!

My thanks to **Prefers to Remain Anonymous 106** for *upgrading* from a free subscriber to Zero Retries to an **Annual Paid Subscriber** this past week!

Financial support from Zero Retries readers is a significant vote of support for the continued publication of Zero Retries.

3300 Email Subscribers This Past Week!

It *still* seems surreal to me that Zero Retries *now* goes out to *more than 3300 email subscribers*, and unknowable numbers of followers via RSS and pass-along, all over the world every week.

As a horribly rough guesstimation from email addresses I see subscribing, besides the primary audience here in the US, Zero Retries has a fair number of subscribers in Canada, UK, Germany, and a small number in Japan. As far as I'm aware, Zero Retries doesn't have much of a following in China, Thailand, and Republic of Korea, which are other countries with pretty big populations of Amateur Radio Operators, per ChatGPT 5.1¹, .

I know there are Zero Retries Interesting projects, products, etc. happening in Japan as I get periodic (but very brief) blips of info. But I've not yet been able to "crack the code" of following a regular source of information for such things in Japan, or finding a regular

correspondent to assist me in this. With the AI tools, this should be doable by now, but the *trick* for that is finding a regular source of information about Zero Retries Interesting activities going on in Japan that I can follow. One example is early in Zero Retries, I periodically checked the website of [Packet Radio Users Group \(PRUG\)](#), but there are no recent updates there.

ARRL 2024 Annual Report

Now that I'm a (renewed) ARRL dues-paying member, I have (renewed) *standing* to comment on ARRL issues.

The just-released [2024 ARRL Annual Report](#), announced² in the ARRL Letter dated 2025-11-14 (*10.5 months to release it?*) had a lot of information to consider.

To the positive, ARRL has committed to getting Amateur Radio more deeply involved in youth Science, Technology, Engineering, Math (STEM) curriculums (and, presumably, elevating the profile of ARRL), as well as other “bright spots” that I mentioned in my recent article (linked above).

To the negative, I despair that ARRL leadership just does not seem to grasp the digital / data / Software Defined Radio / and *really, really soon* AI aspects of radio technology... and Amateur Radio's role in this era and beyond. There was just no mention of any of that³.

Understood that organizational Annual Reports are largely a public relations exercise - rah, rah, see our good works, etc. But Annual Reports are also vehicles for external parties to “take the temperature” of an organization before considering supporting it financially, getting involved with it... and especially whether it's relevant to society. If I was ever asked to get involved in a large organization (as a volunteer, or otherwise), I'd read that organization's annual reports to get some idea of what I'm being asked to become involved with.

While my article mentioned above didn't exactly say this (perhaps it should have), ARRL is foundational to Amateur Radio, especially US Amateur Radio. Thus what it does, how it does, its perspective, etc. *matters*. Thus ARRL issues are worth discussing publicly in an *independent venue* like Zero Retries. In this, I'm joined by my friend and Zero Retries Pseudostaffer Dan Romanchik KB6NU who writes [informed, thoughtful commentary, from standing, about ARRL](#) on his excellent blog.

Thus, at a first glance, the ARRL 2024 Annual Report doesn't pass my Zero Retries metric of it being helpful in promoting *Amateur Radio of the 21st century*.

I'll read the ARRL 2024 Annual Report in depth and discuss more details in a future issue of Zero Retries.

No Comments This Issue

I can foresee that there will inevitably be a “troll factor” reaction to the big story in this issue. There would probably be folks not normally involved in Zero Retries that would want to comment (negatively, not constructively) only on the big story of this issue - trolls.

At the moment, I don't have a staff or community to moderate comments and deal effectively with the troll factor. Thus disabling comments on this issue (and past issues) of Zero Retries is the only realistic way to deal with the troll factor. This isn't censorship - *my* newsletter, I do the *work* (10+ hours just today), *my* rules, *my* time, *my* *attention*.

Of course, folks are free to email me to express their opinion, and also free to express their opinions on their own venues.

Weekends Are For Amateur Radio!

Have a great weekend, all of you co-conspirators in Zero Retries Interesting Amateur Radio activities!

One of the new toys to play with this weekend is the Starlink Mini unit, and possibly getting the 44Net VPN router configured for a 44Net static IPv4 address to work with it. I wanted to get some accessories for the Starlink Mini and ended up ordering a 12 volt "car" adapter (*when* will we get a modern, universal 12 volt power connector?) and an Ethernet cable. I looked on Amazon for a Starlink Mini 12 volt power adapter and what I saw scared me - random alphabet soup brand names. *Nope!* I went to Starlink and they had the good stuff... a bit pricey, but both the power adapter and the Ethernet cable had the appropriate weathertight gasket on the connector, so well worth the slight extra cost. I'm going to pair the Starlink Mini with a fully charged battery unit and see how it goes.

Steve N8GNJ

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Making the Most of the 44Net Cloud

By Dave Ginsberg N3BKV

Why 44Net Matters to Today's Ham

Ham radio has always pushed technical boundaries — from spark to SDR, from coax to cloud. The 44Net (AMPRNet) is one of those under-used treasures: a globally routable IPv4 network block reserved for licensed radio amateurs.

With 44Net Cloud and a modern VPN tunnel, you can easily and securely host web services or link digital systems — without fighting NAT, blocked ports, or dynamic IPs. It allows you to have an externally routable IP on your home network without a lot of setup work.

For many of us running remote or experimental systems, 44Net Cloud is the missing link that ties it all together.

What Is the 44Net Cloud?

44Net Cloud allows you to get a public 44.x.x.x address for your server — even if your ISP uses CGNAT or blocks inbound traffic.

Instead of complicated IP-in-IP tunnels or BGP routing, you can create a simple WireGuard VPN connection to a 44Net Cloud gateway nearest you.

Once connected, your system behaves as if it's on the internet, visible worldwide.

My Use Case

As I described in my blog post [“Why You Might Want To Set Up Your Raspberry Pi Internet Web Server on 44Net”](#), I wanted a way to host my blog from a Raspberry Pi — reachable worldwide, but separated from my home network.

By connecting my Pi to a nearby 44Net Cloud gateway via a Wireguard VPN, I was able to serve my ham blog mirror and test other applications like Node-RED and Grafana visualizations over the 44.x network.

My self-hosted blog, on 44Net (mirrored from Blogspot, linked above), is hamradiohacks.n3bkv.com, using IPv4 address 44.31.197.120.

More Use Cases for Hams

- Remote SDR control – operate your station securely from anywhere
- Club infrastructure – host Nextcloud, chat, or logging services for members
- Mesh backhaul – bridge remote repeater or microwave links through 44Net
- IoT & monitoring – connect sensors, weather nodes, and dashboards securely

Security First – Don't Skip Past These Suggestions

Because 44Net addresses are *publicly routable* and you have *no protection* as you would on your home ISP, so you should always:

- Use SSH key-only access (no passwords) to your computer
- Enable firewall rules to restrict ports open to the internet (typically 22, 80, 443)
- Run fail2ban or equivalent intrusion prevention
- Use VLAN or set up a separate network for isolation — don't bridge your RPI to your home LAN

These principles are built into my Wireguard setup script as well discussed in a blog post I wrote on [how to use SSH keys on your Raspberry Pi](#).

Conclusion

44Net Cloud opens up new frontiers for amateur experimentation — from remote operation to service hosting and digital networking — using infrastructure *we* control.

If you've ever wanted a public IP for your shack, repeater, or Raspberry Pi project without the hassles of commercial hosting, setting up BGP, etc. - 44Net Cloud is the way to go.

Explore the full guide and get the scripts here:

[GitHub: n3bkv/44net-cloud-wireguard-rpi](#)

[Full article on HamRadioHacks.blogspot.com](#)

***Editor's Note** - My thanks to N3BKV for this great intro article on the 44Net VPN. I plan to do the same as N3BKV to re-host my N8GNJ.org blog and other systems that I want to offer direct access to, via my Starlink system(s) (CGNAT - ugh!) which would be impossible without using a VPN for IPv4 access or using IPv6.*

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In Defense of ARDC and its Grant Funding / Process



Image courtesy of ARDC

By Steve Stroh N8GNJ

In her post - [Lemons Can be Turned into Lemonade](#) ([backup link](#) if it's taken down), Michelle Thompson W5NYV, who is is a [Director, Co-founder, and CEO of Open Research Institute](#), makes a number of inflammatory statements about ARDC, its grant funding, its process, and the ARDC grant funded project MMDVM.

*In this article, I offer my opinions and perspective on W5NYV's overall perspective in that post. **What follows is solely... my... opinions and perspective.** I won't address specific statements W5NYV makes in her article.*

This "legitimacy of ARDC" issue has come up repeatedly, such as the perspective of Bruce

Perens K6BP - [What's Wrong With ARDC?](#) Thus it's worth fully explaining my perspective on this issue, in detail and depth, so it can be referenced, or reused, when this inevitably (it seems) comes up again in the future.

What follows is simplified, truncated, with few historical references cited. Again - **solely... my... opinions and perspective**. I do not represent ARDC or MMDVM Project or anyone else, and did not consult with ARDC or MMDVM or any associated individuals in the formation of this article.

I will draw on some knowledge of ARDC's processes from my stint on ARDC's Grants Advisory Committee in 2021 and 2022.

Background on MMDVM Grants from ARDC

I am, at times, critical of ARDC (as they well know). One criticism of ARDC is that they are *not entirely diligent* about listing all grants that they award, in a timely manner, on their [Awarded Grants page\(s\)](#). In particular, relevant to this discussion:

- ARDC awarded a grant to [MMDVM in 2023 for \\$125k](#). That was listed on the [2023 Awarded Grants subpage](#).
- ARDC awarded a follow-on grant to MMDVM in 2024 for \$180k. [That grant is not, at the time of this writing, listed](#) on the [2024 Awarded Grants subpage](#), only mentioned as one of a number of Research and Development grants on page 24 of [ARDC's 2024 Annual Report](#):

Multimode Digital Voice Modem (MMDVM)

Multimode Digital Voice Modem (MMDVM) Project

Continue full-time development of its open-source digital voice modem, which supports multiple amateur radio modes.

\$180,000

These two ARDC grants are relevant in the discussion that follows.

Addressing the Ongoing Criticism on the “Legitimacy” of ARDC’s Endowment

ARDC is organized as a 501(c)(3) – *charitable, educational, and scientific* organization

Type - *Private foundation (grantmaking)*

Description - *Provides grants for education, research, experimentation, and advancement of digital communications in amateur radio and related fields.*

It's now well known that ARDC's > \$100M endowment resulted of the sale of 4M, of the 16M IPv4 Internet addresses (44 Class A IPv4 address block) that were allocated to “Amateur Radio” in 1981 during the formative years of the Internet. For reference, the universal use of TCP/IP began 1983-01-01.

From [ARDC About](#):

44Net

ARDC got its start when Hank Magnuski, KA6M, was assigned the class A 44/8 netblock of 16.7 million IP addresses for use by licensed amateur radio operators worldwide. Today, this block, known as AMPRNet or 44Net, includes more than 12 million IP addresses in the 44.0.0.0/9 and 44.128.0.0/10 address spaces.

Even in those “loosely organized” days of the Internet, despite the 44Net Class A address block being assigned for “Amateur Radio”, *someone* had to be granted “custody” of those IP addresses (administrator at fault). Initially that was KA6M, then that role transitioned to [Brian Kantor WB6CYT](#). Over time, WB6CYT recruited others to manage 44Net / AMPRNet, which continued, for years, then decades, as an informal group.

From [ARDC In Memoriam: Brian Kantor, WB6CYT \(1953-2019\)](#):

... ARDC was founded as a nonprofit in 2011. Its primary goal was to ensure that 44Net, then known as AMPRNet, would always be a resource for amateur radio operators for experimentation with digital communications. As noted in ARDC’s application for nonprofit status, its activities were to include the stewardship and conservation of “scarce AMPRNet Internet protocol resources, and to educate network users on how to efficiently utilize these resources as a service to the entire Internet community.”

Not quite spelled out in the above is that ARDC was created in reaction to the modern Internet consuming more and more IPv4 addresses. Informal groups like (prior to ARDC in 2011) 44Net / AMPRNet were vulnerable to “hostile takeovers” / “address reassignments”, etc. (predatory) processes by commercial companies. If 44Net / AMPRNet’s 16M IPv4 addresses in the 44 Class A address block were to remain available (for free, for experimentation, for non-commercial use) to Amateur Radio, an organization had to formally “take title” to the 44 Class A address block.

My *impression* is that the leadership / organization of ARDC in those early days was self-selected; those that were *interested* in doing the work *showed up to do* the work. There was little or no funding of ARDC at that point, and ARDC’s task was solely to manage 44Net / AMPRNet (the AMPR.org domain).

Then, in 2019, the modern phase of ARDC, the financial capability to provide grants, began. From [ARDC About](#):

Our grant program

In 2019, we realized that radio amateurs would probably never use the entire block of addresses and decided to sell one-quarter of them. We also changed our organizational structure from a nonprofit corporation to a private foundation and established a grant program, using the proceeds of that sale to fund the program.

Here is, to me the primary argument that the sale of 4M of the 16M IPv4 addresses in the 44

Class A address block was “entirely legitimate” to reform ARDC into an organization to make grants is mentioned in [ARDC In Memoriam: Brian Kantor, WB6CYT \(1953-2019\)](#):

Grants were also part of Brian’s vision. The application also noted that ARDC’s activities were to include “the issuance of grants and other financial support to educational institutions, foundations and other organizations.” To further this goal, Brian almost single-handedly negotiated a deal in 2019 to sell one-quarter of the 44Net address space and set up the endowment that ARDC now uses to fund its grant program. Although he was criticized by some at the time for this sale, there’s no argument that this grant program has proven to be a boon for amateur radio.

If there was *any* entity - group or individual, that could be considered to be “empowered” to make such a substantive change in ARDC / 44Net / AMPRNet... *it would be WB6CYT from his decades of unsung, unpaid stewardship of 44Net / AMPRNet*, and those who assisted him in managing and coordinating 44Net / AMPRNet that evolved into ARDC.

Post-publication Update: *As another “...any entity - group or individual, that could be considered to be “empowered...”*, there is Hank Magnuski KA6M - the original applicant for 44Net to be considered. KA6M served on the ARDC Grants Advisory Team for three years - 2020 - 2022. I overlapped with KA6M on the GAC in 2021 and 2022, and (in my presence) KA6M never expressed any qualms about the “legitimacy” of ARDC or the sale of 25% of the original 44Net IPv4 address block.

Thus I consider the conversion of ARDC / 44Net / AMPRNet, as it ultimately evolved, to an entity that was empowered to choose to sell 25% of the (then) 16M 44Net IPv4 addresses for more than \$100M, which was used to fund ARDC’s endowment for which to fund grants...

to be wholly, totally legitimate.

To answer a common point, *just once*, no one “elected” the leadership of ARDC. Those who did the work that needed to be done to keep 44Net / AMPRNet going, decided amongst themselves how 44Net / AMPRNet, then eventually ARDC, should be organized and governed, and what its priorities and activities should be, and how best to accomplish those priorities and activities. While the early 44Net activity, like the early Internet, was often operated as “general consensus”, ARDC and 44Net, *by necessity*, eventually had to outgrow that informality - as did the coordination of the Internet.

ARDC was never a democracy where there should have been (or could have been⁴) “every Amateur Radio Operator should have had a vote”.

ARDC is a US private foundation and thus entirely self-governed by its internally selected eight person [Board of Directors](#). The Board of Directors decides on (paid) staff.

How ARDC Operates Its Grants

Conceptually, it’s pretty simple how ARDC grants operate.

- ARDC explains what kinds of grants it is willing to fund. Development of new data radios / modes - *yes*. Planting trees - *no* (worthy as that is).

- Those who wish to receive an ARDC grant apply with what they hope to accomplish, with supporting documentation. Applicants must be a not-for-profit entity (or be sponsored by an entity that is, and willing to administer the grant funds to the applicant) or equivalent not-for-profit entity such as an educational institution or government institution.
- ARDC evaluates the grant application and if it's in scope, and the organization is appropriate for receiving grant funds, it goes into a queue for consideration.
- If a grant application is funded by ARDC, the organization receives a funds transfer from ARDC to start the work.
- The work outlined in the grant proceeds and the organization is supposed to send periodic status reports to ARDC (I don't know the frequency). When the project is complete or the project timeline is up, a final report is submitted.

ARDC (very reasonably, in my opinion) expects the organization to use the grant funding to accomplish the work stated in the grant application. To use my previous example, development of new data radios / modes, not “abrupt a pivot that's out of scope”, such as planting trees.

As laudable as goal as “open ended Research and Development” might be for an Amateur Radio grant, funded by ARDC... that's just not realistic. There are too many good ideas / worthy projects applying for limited grant funding available from ARDC in any given grant period (quarterly tranches). In this, ARDC is merely trying to be a good steward of its limited grant funds to fund the projects that are the best grant funds in a particular quarterly tranche.

Thus, ARDC (very reasonably, in my opinion) asks grant recipients to generally “stick to the original plan” and not expand the scope way beyond the original plan. There are exceptions such as when circumstances make it impossible to accomplish the original goals in the grant application (for example, the great component shortage coinciding with COVID), or a key developer is no longer available, or the original plan / goals turned out to be wildly unrealistic due to unforeseeable circumstances. *We're Amateurs at Research and Development stuff, after all.*

Paid Professional Technical Labor

ARDC grants make provisions for paid professional technical labor. A lot of people who don't understand the nuances of this get a bit... *weird*... when they hear that “ARDC pays you to do Amateur Radio”. *Yes... kind of.* But, mostly, no. It's a fine distinction.

First... why does ARDC allow individuals “to get paid to do Amateur Radio development”? I explained this in Zero Retries 0000, in these stories:

Story 3: The Radios That Weren't; Part 1

Story 4: The Radios That Weren't; Part 2

TL;DR of those two stories is that amateur development (as in part / personal time, with personal or very small business resources) simply took too long to develop and by then, critical

parts transitioned to unobtainium, or the market or technology had changed so significantly that the project couldn't be built, or was no longer relevant.

The only cure for those issues is *focused* development with professional resources to get the project done in a reasonable time, be relevant to the market, and offer current technology.

The reality is that folks that have certain skills relevant to Amateur Radio development in the 21st century - Software Defined Radio / GNU Radio, FPGA design, VHF / UHF / Microwave circuit board layout, now AI / ML expertise are very much in demand with limited time.

I remember vividly when I brought this background into ARDC's 2021 Grants Advisory Committee (GAC), that ARDC *should be, as part of a grant, willing to pay for Professional Technical Labor*. Some members of the 2021 GAC were adamantly opposed to doing so. My perspective - willingness to pay for Professional Technical Labor, prevailed.

I offer the following "excursion" from the discussion of ARDC grant funding as a specific illustration of the point I'm trying to make.

One example of the application of Paid Professional Technical Labor that I can cite from personal experience is [IP400 Network Project](#):

... developing the IP400 Network Project with ARDC funding to modernize amateur radio data communications. The project introduces a high-speed, plug-and-play data radio for UHF and VHF. It uses affordable IoT chipsets and Raspberry Pi computers. IP400 supports both repeater linking and mesh networking, with a focus on rural access. A key feature is an OFDM modem that can send different types of data, such as voice, telemetry, and video, to multiple users at the same time.

The primary developer of IP400 Network Project is Martin Alcock VE6VH. I worked with VE6VH during the early scoping of the IP400 Network Project. I can attest that he has direct, deep experience with the fundamentals of OFDM technology. This portion of ARDC's grant description is easy to overlook:

A key feature is an OFDM modem that can send different types of data, such as voice, telemetry, and video, to multiple users at the same time.

This potential variant of OFDM *could be a very, very big deal - profound. Truly transformative.*

[Orthogonal Frequency Division Multiplexing \(OFDM\)](#) is a waveform that transmits multiple, distinct, individually managed subcarriers. *If VE6VH can accomplish it... Amateur Radio will have the first (that I'm aware of) implementation of individually addressable OFDM subcarriers.* A single transmission could contain not only multiple *types* of data, but unique data *individually addressed to individual stations - simultaneously*. Imagine the efficiency of mesh network if, with a single transmission burst (as opposed to sequential transmission bursts, each of which is addressed to one station, with all of the other stations on the channel "standing by" for *their* transmission, in turn), you could send individual data to multiple stations within range of your transmission - simultaneously.

Potentially, if the data to be transmitted requires more bandwidth, such as an image, multiple subcarriers could be dynamically aggregated to transmit that image, potentially within the same data burst. If the data requires minimal capacity, such as a text message to a specific station, or a Hailing Channel broadcast packet, then using a single subcarrier would probably suffice.

The potential efficiency gains for channel utilization are staggering!

The earlier (easier) parts of the IP400 Network Project were implemented by VE6VH using personal time and personal and club resources. But, the OFDM work is going to be hard, intense, time consuming, will require professional tools (FPGA development) and perhaps even more specialized professional labor than VE6VH alone.

Thus this Research and Development of implementing an entirely new (again, as far as I'm aware) implementation of OFDM can only happen because of ARDC's *willingness to fund Paid Professional Technical Labor*.

I know that this is a very narrow distinction, but (again, staying with this particular example of IP400 Network Project), but ARDC isn't paying VE6VH per se to do work for hire. Rather, an ARDC grant is paying (in this case, Alberta Digital Radio Communications Society) to allow VE6VH the focused time, and the needed tools (and perhaps additional professional technical labor) to apply his unique background and professional labor (skills) to the potential implementation of individually addressable OFDM subcarriers... for the benefit of Amateur Radio (and well beyond Amateur Radio).

Big Money Distorts, and Stifling Open Innovation?

Um, no. Some folks seem to have the opinion that “big money distorts the purity of Amateur Radio experimentation”. Maybe, in some specific cases with particular ARDC grants, groups, individuals, and projects. Part of the learning curve of the two Grant Advisory Teams I was part of, and ARDC in general... without breaking confidentiality... I'll just say that *some ARDC grants didn't work out as planned*.

But I'll happily trade that potentially (again, in *some* cases, *arguably*) “lost purity of Amateur Radio experimentation” in exchange for several million dollars being pumped into various aspects of Amateur Radio, worldwide, *every year. Every year. In perpetuity*, if ARDC's financial folks did their job well, by investing ARDC's endowment funds prudently for a reasonable, sustainable rate of return on investment. If you have doubts, look at the [almost seven years of interesting projects that have been funded by ARDC grants](#), starting in 2019. You can also look at the mandatory reports that ARDC must file with the US Internal Revenue Service.

Just as *one stellar example* of the good that ARDC grants have done, Amateur Radio (worldwide Amateur Radio - not just US Amateur Radio) *finally* has a universal online library for Amateur Radio - [DLARC](#), that's appropriate for the 21st century. That DLARC exists is entirely due to an initial ARDC grant, and now a follow-on grant from ARDC. Without those ARDC grants, we wouldn't have DLARC - *only ARDC was willing to (significantly!) fund the idea of DLARC*.

One last straw man argument that comes up periodically is that by ARDC funding certain grant

proposals, and not others, somehow stifles “open innovation”. *I don’t see how that could be the case.* ARDC’s grants can help *accelerate* some projects, but there’s nothing about ARDC’s grants or other activities that are *stifling* projects that haven’t received ARDC grants. Those other projects might not progress as fast or as far as a project that does receive an ARDC grant.

The only legitimacy I can grant this “stifling” straw man argument is that some projects that don’t receive an ARDC grant, simply won’t be attempted. Returning to my earlier example of the IP400 Network Project, I can attest that the OFDM development phase would not have been attempted if not for the ARDC grant the IP400 Network Project received (again, via ADRCS). The OFDM development was just too much work, requiring too many resources, and would take too long to be practical to attempt with personal time and personal / club resources.

Lastly, if a grant proposal isn’t funded by ARDC, my observation is that it’s almost always “not *this time*” or “this grant proposal needs some work”. I’ve seen, and been behind the scenes of several grant proposals that were initially rejected, and then accepted after a rewrite, or resubmitted in a later grant cycle.

Post-publication Update: One “process” thing about ARDC grants that’s not widely understood is that ARDC grant proposals are evaluated for funding in approximately quarterly tranches. Thus if there are more good grant proposals received within a particular tranche than there are funds allocated for that tranche, then inevitably some don’t get funded (but there are exceptions).

In my opinion, it’s rarely the case that *ARDC will never fund this project* unless it’s completely out of scope, or there’s another major disqualifying factor (such as total cost - ARDC isn’t the Ford or Rockefeller Foundation). If there’s a worthy idea that’s within scope of an ARDC grant, and the initial grant proposal is rejected, try, try again, unless ARDC tells you not to. For example, I recognized one project that ARDC funded in 2025 that was first submitted, and rejected, in 2021 or 2022 when I was on the ARDC Grants Advisory Committee.

In Conclusion

I have a personal interest in what ARDC is doing with its grants. When I began Zero Retries in mid-2021, in **Zero Retries 0000**, Amateur Radio SWOT - Minus the SW and T, I wrote, in part:

There are two things that might save Amateur Radio. The first is engaging (recruiting, evangelizing) a new type of Amateur Radio Operator who have technical backgrounds and decide to get an Amateur Radio license because it will be useful to them in their technical career (or interest, in the case of makers or STEM students to do so.

The second is the “financial leverage” that ARDC could potentially bring to bear on issues confronting Amateur Radio. Such issues include fundamental research and development for new types of Amateur Radio systems, subsidizing hardware, developing software, public relations for Amateur Radio, regulatory reforms at the FCC, helping new organizations become established, and many other areas where financial resources could make a significant contribution to the overall health of Amateur Radio.

If I had not seen for myself, directly, the impact that ARDC grants had then begun making, and could potentially make in the coming years as ARDC built up their grant making capabilities to “fully engage”...

I may well have despaired that Amateur Radio was doomed, and concluded it wasn't worth the work and time that I would end up pouring into Zero Retries. Not to mention all the other Amateur Radio advocacy activities that have resulted such as ZRDC 2025, replying substantively to FCC Requests for Comments, giving presentations, working behind the scenes (you'd be amazed... *I'm amazed...*), etc.

In stating that ARDC, through its grants, is making an enormously positive, progressive difference in Amateur Radio, I'm drawing on a number of inputs:

- In working on Zero Retries, I observe a much “bigger picture” of Amateur Radio than most folks do. Just one example is the unique perspective of observing how Amateur Radio is perceived by the attendees of GNU Radio Conference 2025. Again, Software Defined Radio technology is the present and future of Amateur Radio... most Amateur Radio Operators just don't realize it yet, and the GNU Radio folks are at the forefront of this foundational, generational shift of radio technology and subsequently, Amateur Radio technology.
- In writing Zero Retries, I focus on different aspects of Amateur Radio than most folks, such as data communications and GEO satellites, that are ignored by most folks involved in legacy Amateur Radio, legacy Amateur Radio manufacturers, and most Amateur Radio media.
- I pay close attention to what ARDC does via what they publish, what's posted on their Awarded Grants page, what ARDC folks say when they appear on videos, podcasts, and presentations, etc. - *far more than closely than most folks do*. I've brought issues to the attention of ARDC staff about some issues of what was *published on their web pages* - that they weren't aware of until I pointed out the issue.
- I was actually involved, as a volunteer, on the inside of ARDC during my two years of serving on ARDC's Grants Advisory Committee. While I maintain confidentiality of specifics of what I saw and was involved with then, the quality of the people and the organization, and their dedication to try to do the right thing has informed my positive perspective of ARDC as a whole.

Thus I'm comfortable in stating that in my (what I consider, *informed*) opinion, that ARDC is entirely legitimate, and that ARDC is doing the right thing, for Amateur Radio, and related fields such as scholarships, with its grant program.

Carry on with your mission, ARDC - volunteers, staff and leadership. You're doing great work and making an enormous difference - in Amateur Radio, and beyond.

Share

ZR > BEACON

By Steve Stroh N8GNJ

Short mentions of Zero Retries Interesting items.

[Utah Digital Communications Conference 2026 - Call For Proposals](#)

February 28th, 2026

We are excited to announce our 9th Annual Utah Digital Communications Conference, scheduled for Saturday, February 28, 2026, at the Salt Lake Community College Miller Campus in Sandy, Utah. This is a great one-day event to learn about digital modes, emergency preparedness, and general Amateur Radio topics.

Call For Proposals

Our volunteer presenters are the key to a successful event. We are now accepting presenter applications for the 2026 conference. We are seeking presentations on a wide range of topics, including digital communications, modes and technology, and general amateur radio interest sessions.

Submit a presentation proposal here or volunteer someone who needs a gentle nudge to share their expertise and knowledge.

We are especially interested in the following topics:

- Node Red for Amateur Radio Use
- Home Automation - getting started with tools like Home Assistant, etc
- POTA - how to get started, logging, awards, etc.
- Emergency Communications and Preparedness as an Amateur Radio Op
- Repeaters, hot spots etc.
- How to use an oscilloscope
- Infrastructure to support public service and emergency communication events
- Software-defined radio

[Call For Proposals \(Link\)](#)

SEA → SLC airfare seems reasonable. *Maybe* UDCC 2026?

[GNU Radio Conference 2026](#)

2026-09-21 thru 24 in Raleigh, North Carolina, USA

GNU Radio Conference (GRCon) is the annual conference for the GNU Radio project and community, and has established itself as one of the premier industry events for Software Radio. It is a week-long conference that includes high-quality technical content and valuable networking opportunities. GRCon is a venue that highlights design, implementation, and theory that has been practically applied in a useful way. GRCon attendees come from a large variety of backgrounds, including industry, academia, government, and hobbyists. Offering an annual program with broad appeal, GRCon attracts a variety of participants: people new to software radio who are interested in learning more, seasoned developers ready to show off their latest work, and experts who want to keep their finger on the pulse and direction of the industry.

GRCon26 will be the 16th Annual GNU Radio Conference in Raleigh, NC, September 21-24 2026.

GRCon26 is generously hosted by North Carolina State University, which is home to one of the four NSF PAWR platforms, the AERPAAW wireless research platform (<https://aerpaw.org/about/>)

[We invite developers and users from across the GNU Radio Community to present your projects, presentations, papers, posters, and problems at GNU Radio Conference 2026.](#)

This sounds cool to have it at NC State University and near the AERPAAW.

[Ham66 Low Cost Digital Amateur Radio Television Low Cost Receivers for W6CX ATV Repeater](#)

Spotted in the November / December issue of Mount Diablo Amateur Radio Club's newsletter [The Carrier](#) (not available online at the time of publication):

Low Cost, pre-programmed to W6CX ATV Repeater. Most with Remotes. \$25 each with remote (or \$20 without remote).

No shipping, as these are for local pick- up. These are used units in good / great shape.

This is a generous offer from Will Roberts KA3VDT for those in the San Francisco, California area. Imagine the impact being able to watch the activity on an Amateur Radio Television with a low-cost receiver like this to cultivate interest in Amateur Radio, seeing techie individuals having fun with actual over-the-air (digital) television.

I think every big Amateur Radio club in a metro area should be thinking seriously about putting up a *Digital* Amateur Radio Television repeater. *This is a video era* - TikTok, YouTube, etc. Thus DATV is one *very relevant way* to show off Amateur Radio's technological capabilities.

Not Internet video watching or chatting... *anyone* (literally) can do *that*. But only Amateur Radio5 allows individuals to transmit video over the air.

M17 Specification Release 3.0.0 – Draft

Wojciech Kaczmarek SP5WWP on the M17 Project website:

The M17 specification is being updated with the following changes, most of them breaking:

- **TYPE** field has been completely restructured, including Packet/Stream bit removal
- changed the way text messages are sent using the **META** field; set padding bytes to 0x00
- various cleanups

We have spawned a separate **dev** branch for the draft: https://github.com/M17-Project/M17_spec/tree/dev

The document is available for review below. Comments are welcomed!

[M17_spec_3.0.0-draft](#)

This is one of the things that I really admire about the M17 Project. It's not static... fossilized... *done* like other digital voice systems we're using in Amateur Radio. When's the last time you saw any substantive improvement in DMR or D-Star or SF? Like FreeDV with RADE, M17 is *improving... evolving... growing*.

Inovato Closing Permanently - 2025-12-19

[**Michael Burmeister-Brown**](#) *inovato* *Founder*

Nov 17, 2024

Dear Fellow Hams,

I want to say a huge thank-you to the hams who have sent hundreds of prayers and well wishes. These have largely kept me and my family going since July 2024 when I got my diagnosis of pancreatic / lung cancer. I am blessed to have the best customers in the world. I can't thank you enough.

Due to various treatments, I have been able to keep inovato going, but the time has come to finally close shop. For a limited time, I will still try to answer questions on the forum, but it will also close at some point. **The online store will be the first to close as of December 19th, 2025.**

For those that want to build their own hamclock, I highly recommend this tutorial:

[How to set up a HamClock for your shack | QSO365](#)

Thank you everyone for your patience and support of this project.

73,

Michael

P.S. I release all support content and the Quadra Restore Image to the community.

Inovato became very popular for offering a low-cost dedicated appliance computer for running the HamClock app, already set up as a Linux image to run on the newer Inovato Quadra4K unit. They work really well, and Michael has been an incredibly supportive and reliable vendor to the Amateur Radio community. Michael and his family have been a vendor at the SEA-PAC conference and each time they've sold out their entire stock that they brought to the conference.

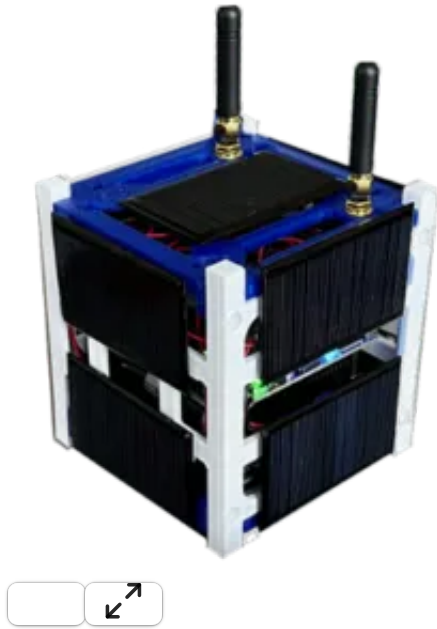
I ~~gotta get~~ got a couple on order before they're gone / closed.

[Alan Johnston, KU2Y, Presents CubeSat Simulator 2025 Updates](#)

From ANS-306 AMSAT News Service Weekly Bulletins, November 2, 2025 by Frank Karnauskas:

During one of the always popular CubeSat Simulator (CSS) presentations, Alan Johnston, KU2Y, AMSAT VP-Educational Relations showcased recent improvements to the CSS at last month's AMSAT Annual Space Symposium.

The AMSAT CubeSatSim, the CubeSat Simulator, is a small, low cost, spacecraft simulator that serves as a tool for academic education, public demonstrations and theory and design disciplines. It can be used in a classroom, lab or training setting to introduce the basics of satellite operations, or it can be used to teach Science, Technology, Engineering, Math (STEM) exercises.



The pace of development in 2025 was similar to 2024 with several new features rolled out. The v2.1 software release added two new telemetry modes: FunCube Mode and Cross Band Repeater Mode. In addition, the Fox-in-a-Box v4 Beta Raspberry Pi Ground Station disk image was also released.

Cross Band FM Repeater Mode

The CubeSatSim Cross Band FM Repeater mode uses the FM transceiver module in receive mode, with the squelch pin read by the Raspberry Pi Zero to detect a transmission. This mode utilizes the USB sound card connected to the Pi Zero 2 with the OTG cable, and the audio jumper from the Main board to the sound card provides the received audio to the Pi Zero. The Pi Zero 2 then connects the microphone input to the rpitx transmitter. One of the CubeSatSim antennas is receiving the UHF signal, the other is transmitting the VHF signal at the same time, just like a real CubeSat with an FM repeater.

The v2.0 software release had a Repeater mode, but you couldn't turn it on and off with the pushbutton, and it was unstable in that the repeater function would stop working and require a reboot. It also had uplink and downlink frequencies in the UHF band which made reception difficult. The v2.1 software release has fixed these issues, and moves the downlink to the VHF band. This provides a "U/V" operation with an FM UHF uplink, VHF downlink similar to many AMSAT CubeSats such as AO-91 (RadFxSat / Fox-1B) and AMSAT-UK AO-73 (FunCube).

New FunCube Mode

The CubeSatSim now has a new FunCube Mode 7. This BPSK (Binary Phase Shift Keying) 1200 bps (bits-per-second) transmission mode emulates the AMSAT-UK FunCube CubeSat (AO-73) and several other CubeSats that also use this transmission including Nayif 1 (EO-88), UKube-1, and JY1 Sat (JO-97). The

transmission is very similar to the Fox-1E BPSK 1200 bps transmission already supported by the CubeSatSim in BPSK Mode 3. However, it has a different data structure and error correction. Special thanks to Duncan Hills, the lead FunCube Dashboard developer from AMSAT-UK who provided technical details and support to get this code working! If you listen to this mode, it sounds similar to BPSK, except for every four seconds it sounds like there is a “beep” or tone.

To decode FunCube telemetry, you need a FunCube Dongle (FCDPro or FCDPro+) and decoding software (an RTL-SDR dongle will not work). For the FunCube satellites in orbit, there is a Windows Dashboard for each satellite that decodes the telemetry and uploads the data to the AMSAT-UK Data Warehouse. We don't yet have a Windows Dashboard, but we do have a Raspberry Pi application which will decode it. It is part of the new Fox-in-a-Box-v4 beta image.

The telemetry data is a similar format to JY1 Sat (JO-97) with a camera image and telemetry data in each frame. Unlike the CubeSatSim SSTV mode 4 which uses tones to transmit image pixels in Scottie 2 format, FunCube uses SSDV to encode JPEG images suitable for packetization. It uses the Reed-Solomon codec written by Phil Karn, KA9Q. You can see the image come in block by block, and if a frame is lost, there is a rectangular dropout in the image. Otherwise, the image quality is perfect. This makes an interesting comparison with the analog SSTV Mode 4 in which the image quality degrades as the signal strength decreases.

...

To read Alan's complete presentation, go to
<https://drive.google.com/file/d/19o1GsO-R3Btt35AqIsXj4EJPn3eNADcd/view> .

The AMSAT CubeSatSim is a really, really cool project and it's a really effective illustration of what Amateur Radio can do by demonstrating the size and functionality of a 1U Cubesat. I thought at one point AMSAT said they planned to offer an entire kit to build one, and I'd seriously consider that option. I'd love to build one on my own (or with the help of a friend), but I'm just saturated with Zero Retries activities at the moment.

New Zero Retries Interesting Amateur Radio Satellites

From [ANS-313 AMSAT News Service Weekly Bulletins, November 9, 2025](#) by Mitch Ahrenstorff:

SpaceX Bandwagon-4 Mission Places CEVROSAT-1 in Orbit with Rideshare Payloads

SpaceX launched its Bandwagon-4 rideshare mission on November 2 at 0509 UTC from Cape Canaveral Space Force Station, deploying eighteen satellites into a mid-inclination low Earth orbit. The flight is part of SpaceX's dedicated mid-inclination rideshare program, complementing the Transporter series that serves sun-synchronous orbit customers. All spacecraft were successfully released from the Falcon 9 upper stage approximately seventy-five minutes after liftoff.

The manifest included CEVROSAT-1, an amateur radio satellite built by CEVRO University in the Czech Republic in partnership with Mendel University in Brno and Brno University of Technology. The 48-kilogram microsatellite carries a 9k6 G3RUH GFSK digipeater and AX.25 telemetry on 436.025 MHz, coordinated through the IARU. First signals were received shortly after deployment, with amateur operators reporting telemetry and digipeated packets and uploading frames to the SatNOGS network. The satellite supports student research, hands-on engineering education, and amateur radio experimentation, including an Earth-imaging payload and an optical reflector system for laser technology trials.

CatSat to Open Microwave Linear Transponder Access for Amateur Radio Community

The CatSat team has announced that preparations are underway to open public operation of the spacecraft's linear transponder, offering the amateur-radio community a new microwave-band satellite resource. CatSat, a 6U CubeSat developed and flown by students, faculty, and staff at the University of Arizona in partnership with FreeFall Aerospace and Rincon Research, has been on orbit since July 2024 and is now entering the phase of its mission focused on community engagement and technology demonstration.

...

When the linear transponder is active, CatSat listens on 5.663 GHz (uplink) and transmits on 10.47 GHz (downlink), providing approximately 200 kHz of bandwidth. Patch antennas on the spacecraft's -Y face offer roughly 60-degree beam coverage, and the attitude-control system can point the antenna footprint at ground stations for up to 10 minutes per pass. Power considerations limit each activation to about 15 minutes, a balance that allows the spacecraft to support both mission science and amateur communications.

Early on-orbit demonstrations used a 1-meter C-band uplink dish and a 6.1-meter X-band downlink dish to confirm transponder functionality, successfully relaying Morse code. The CatSat team is now constructing a more accessible ground station using 1-meter-class commercial antennas to show that amateur access is practical with reasonably sized equipment. Operators will be able to monitor schedule updates — informally known as the “five and dime” plan — through the CatSat mission website.

Commissioning passes targeting the CatSat ground stations in Tucson took place on October 29 and November 2, with one final activation scheduled for November 9 at approximately 7:50 PM MST (UTC-7) — just hours after this bulletin's publication. As testing continues, dates may shift as the team evaluates performance and power-budget constraints. Operators can follow activation plans and future opportunities at <https://catsat.arizona.edu>.

Read the full announcement at: <https://catsat.arizona.edu/news/catsat-team-preparing-public-linear-transponder-operations>

This was a very Zero Retries issue of AMSAT Satellite Report. There was also:

+ A historic 26-meter radio dish in Rosman, North Carolina—now part of the Pisgah Astronomical Research Institute (PARI)—once served NASA’s Space Tracking and Data Acquisition network and later supported U.S. intelligence operations during the Cold War. Established in 1962, the site tracked early NASA satellites, supported Apollo recovery communications, and later hosted NSA signals-intelligence missions before being decommissioned in the 1990s. PARI’s nonprofit owners have since preserved the facility as an education and research campus, hosting camps, astronomy programs, and university instruments while maintaining operational deep-space-capable antennas. The institute recently listed portions of its 192-acre campus for sale or lease, seeking a partner who will continue its STEM outreach mission rather than convert the property to private development. PARI maintains real tracking capability, recently receiving signals from Intuitive Machines’ IM-1 lunar lander and preparing to listen for NASA’s Artemis II Orion spacecraft regardless of official involvement. Leaders stress that PARI is not shutting down, and they aim to secure support from the growing commercial space sector to keep the iconic “26 West” dish operating as a public educational and scientific asset. (ANS thanks [Space.com](https://www.space.com) for the above information).

Three Zero Retries Interesting Amateur Radio space developments in this issue!

CEVROSAT-1 has a 9k6 G3RUH GFSK digipeater.

CatSat was the satellite I was referring to that [open.space](#) would be a great 5 GHz uplink for, and a challenging 10 GHz downlink.

Being near a big Amateur Radio dish like this - [MIT](#) (wish they would do an update), [InfoAge Space Exploration Center \(ISEC\)](#) in Wall Township New Jersey, [Deep Space Exploration Society \(DSES\)](#) in Colorado and now PARI in North Carolina... would be *such a gathering point* for interesting Amateur Radio / Radio Astronomy techies. If memory serves, there’s also an Amateur Radio “big dish” in California, and perhaps others (if so, please let me know).

I was able to visit the InfoAge dish a few years ago and I was in awe. I’d be a regular if I lived in that area. Imagine the fun of Earth Moon Earth communications with a dish like these at your disposal!

[FreeDV RADE Receiver for \(Web\) Software Defined Receivers](#)

Mooneer Salem K6AQ:

... there’s also a new receive-only integration available that’s intended for web-based SDRs. Originally intended for [ka9q-radio](#), this is an application that accepts audio samples on standard input and outputs decoded audio on standard output. An SDR or other application would simply start this application and route audio through it whenever a user wants to decode FreeDV. The hope is that with this integration, many preexisting web-based SDRs will add support for FreeDV and allow people to listen to contacts over the internet, even if they don’t have a radio

or the needed setup to run the FreeDV application.

When you listen to FreeDV RADE compared to typical HF SSB voice, it's a night and day qualitative difference. To me, it's the voice equivalent of VARA HF for how much difference *modern digital techniques* make for voice communications on HF.

[RADE V1 - First Known Real-world Deployment of a Neural Codec](#)

David Rowe VK5DGR:

...

WASPAA is a professional level acoustics and speech conference where I (along with Jean-Marc) presented a poster paper on RADE V1. This was well received by the other attendees.

It was pointed out that RADE V1 is the first known real-world deployment of a neural codec – an important milestone that the Ham community can be proud of.

Several attendees also thanked me for Codec 2 – it is used in academic research as a (low quality) “control” for various projects.

The above was slightly reformatted from the original solely for emphasis.

Brief explanation for those that haven't followed FreeDV Radio Autoencoder (RADE). The voice digitization / decoding is not done with fixed algorithms as “traditional” digital voice has been done to date. Instead, FreeDV RADE uses Machine Learning - *fully adaptive* digital voice! RADE ends up being not only more efficient (smaller bandwidth) but much higher voice quality. And it happened first, on commodity computing hardware (typical PCs, Raspberry Pi 5) on Amateur Radio.

Yet more technological innovation in Amateur Radio!

I hope the Amateur Radio mainstream media picks up on this significant development.

[OpenMANET - Mobile Ad-Hoc Network](#)

OpenMANET is an open-source project for building Raspberry Pi-based MANET radios on Wi-Fi HaLow (915 MHz) using Morse Micro chipsets. A MANET (Mobile Ad-Hoc Network) is a self-forming wireless mesh where each node connects directly without centralized infrastructure. This technology is especially useful in the civilian space for search and rescue, disaster response, airsoft events, and any disconnected communications scenario. **Designed to be budget-friendly with excellent long-range performance.** The build is designed to integrate with ATAK over multicast, but works equally well over standard IP and internet links.

Systems like OpenMANET based on 802.11ah / Wi-Fi HaLow are, in my opinion, a sleeper technology that will *rapidly* get more popular and more capable, likely eclipsing Meshtastic / MeshCore because they will work how most people expect modern communications to work -

reasonably fast transporting arbitrary data types. It might not be able to support broadband, but it can support file transfers, real email, and depending on latency, perhaps digital voice, etc.

802.11ah / Wi-Fi HaLow has been slow to become usable because of limited availability of chipsets that implement this “new” standard. But the advantages of operating on the (mostly North America) 902-928 MHz / 33cm band (and part of that band in other areas of the world) are starting to be recognized, and these new chipsets seem to be pretty sensitive (and interference-resistant) to achieve reasonable ranges. Antennas for 902-928 MHz are very reasonable (and easy for non-experts to build).

[RX/TX \[Audio Interface / Dire Wolf\] Dongle Choices](#)

John Langner WB2OSZ on the aprsfoundation email list:

Here is some information on USB dongles that can be used for APRS:

<https://raw.githubusercontent.com/wb2osz/direwolf-doc/main/Radio-Interface-Guide.pdf>

My favorites are the ones that use a CM108 or CM119 USB-Audio adapter and use one of the extra pins for Push to Talk (PTT). It's a very tidy solution with only a single USB connection for both audio and PTT.

They don't provide a KISS interface. They are just audio devices. You will also need a software TNC to run on your RPi.

This is a *comprehensive 61 page “guide”* (I'd call it a booklet, minimum) updated as of 2025-10. I just did a quick glance and learned some new things. WB2OSZ furnishes this guide as a PDF, so it's a handy reference to download and have easy reference to locally on your computer.

I particularly appreciate Chapter 5:

Connection to Radio

The major Japanese Ham Radio manufacturers standardized on the same 6 pin mini DIN connector for use with external modems such as a packet radio TNC. It's usually labeled “data” when it is really audio.

I would have called it “external modem” but they didn't ask me for my advice.

...

Use this if it is available. The microphone and speaker connections are optimized for voice operation and intentionally introduce distortion which makes it harder for the modem to operate effectively.

The name **External Modem** makes sense. My preferred term for this (type of) connection (since the pinouts vary - Japanese standard, Alinco standard, BridgeCom standard) is **Flat**

Audio connection which WB2OSZ goes on to explain and illustrate with frequency response diagrams, flat audio versus pre-emphasis / de-emphasis.

While this guide is comprehensive in explaining the theory and details of audio interfaces for Amateur Radio data communications, it's not complete as there are *umpteens* *gajillion* audio interfaces for Amateur Radio use, and this guide only addresses a few that WB2OSZ has personal experience with and can address with authority.

It would be a major effort to address all of them. One example is that it doesn't include a discussion (only a passing mention) of

high performance soundcards ... [that] can use higher audio sampling rates making them ideal for 9600 baud and above.

These points aren't criticisms, and WB2OSZ is asking for help at the beginning of the guide to make it more complete:

Please share what you have discovered so others can benefit from your experience. The best way would be to open an issue in the "direwolf-doc" [<https://github.com/wb2osz/direwolf-doc>] project (not the normal "direwolf" project) so nothing slips through the cracks.

I'm especially interested in what you found when using soundcards and USB PTT control built into some modern rigs.

Regarding the latter request, one such issue I've read about is that while the Icom IC-9700 is well suited for Amateur Radio satellite communications (high power all mode 2m / 70cm / 23cm capabilities), its built-in audio interface does not have sufficient audio bandwidth to do 9600 bps data to be able to communicate with and do command, control, and telemetry for Amateur Radio satellites.

After learning of this guide and skimming it briefly, I'm going to volunteer to help enhance it as this is the best such overall guide about Amateur Radio audio interfaces that I've seen to date.

Kudos to WB2OSZ for this excellent work...and his excellent work on Dire Wolf.

VA7ZEB Line of Sight (LOS) Web App

[VA7ZEB.ca Line of Sight](#)

From [VA7ZEB.ca Principles](#):

... [VA7ZEB.ca](#) is intended to be a lightweight, fast, no-barriers application that stations can use on the fly in realtime while operating. I don't know what device they may be using or what connectivity they will have, so I insist that it works on phones and on IPv6. I want it to be lightweight and fast, so I don't use most frameworks or libraries which often introduce unwanted weight and complexity. I want it to work offline in the future, so I don't use database software, just JSON objects juggled in memory.

Basically, this is a graphical display of 360° of the Line of Sight from your location, taking into account your particular location's elevation and optionally, the height of your antenna.

This isn't an RF propagation tool - it's an optical Line of Sight tool to display terrain obstructions / clear paths around your location

Although it's supposed to run on a phone (it runs in the web browser, not on a server), clicking a precise location on a phone or tablet didn't work very well for me. Typing in my street address wasn't found, and it doesn't accept input of a Maidenhead grid square input. It worked great on my laptop where I could more precisely pan around the map, zoom in, and finally click on my exact location.

This web app takes a bit of clicking around to understand, but once you get a few things sorted out, it's pretty cool and potentially useful. For example, it displayed what I'd long suspected (but had never actually bothered to verify) that from my location near Bellingham, Washington, USA I have a mostly clear LOS path to most, but not all (there are some significant nulls) of metropolitan Vancouver, British Columbia, Canada to my Northwest.

[Save the Date: Annual ARRL YouTube Telethon to Support Teachers Institute](#)

John E. Ross KD8IDJ, Editor in the ARRL Letter for November 13, 2025:

Save the date for the fun and entertaining annual ARRL YouTube Telethon to raise money for the [ARRL Teachers Institute on Wireless Technology](#), which will be held on Saturday, November 29, 2025, on the [Ham Radio Crash Course YouTube channel](#). In past years, tens of thousands of dollars have been raised to support this important program to invest in the next generation of amateur radio!

Hosted this year by YouTuber Josh Nass, KI6NAZ, hear from several amateur radio content creators and technical contributors who will join Nass and others on the stream. ARRL Director of Education and Learning Steve Goodgame, K5ATA, will also join to discuss details of the Teachers Institute and its successes.

The ARRL Teachers Institute is a donor-funded professional development program designed to help classroom teachers elevate their STEM (Science, Technology, Engineering, and Mathematics) programs through the use of wireless technology. There were 13 sessions conducted in 2025.

In **Zero Retries 0227** - Renewed My ARRL Membership, I specifically mentioned the (considerably expanded) [ARRL Teachers Institute On Wireless Technology](#) as one of a number of reasons that I decided to continue my membership support of ARRL. This will be... *interesting*... to watch and see how this is conducted to support TIOWT. I'm a fan of this year's host:

YouTuber Josh Nass, KI6NAZ [[Ham Radio Crash Course](#)]

so that's a bit more incentive to watch this as I putter around in N8GNJ / Zero Retries Labs.

The same issue of the ARRL Newsletter also mentioned that the [2024 ARRL Annual Report](#) is

now available. It includes this mention on page 13:

The department also engaged audiences through partnerships with prominent YouTube creators, including a telethon that raised over \$41,000 for Teachers Institute.

\$41k... that's... pretty decent!

Ham Rocket Men - Launch DVB-T Transmitter

Editor Jim Andrews KH6HTV in Amateur Television Journal, November, 2025, 2nd Edition, Issue #197:

We have just gotten a report with photos and videos from Ken Goldstein, KD5HEH, in Albuquerque, New Mexico about their recent rocket launch on October 11th. ATVers Ken and Tony, KD5CRC, are members of the Albuquerque Rocket Society (www.arsaq.org). Ken said "This was a test flight to see how all of the video equipment worked in an actual test flight."

Ken and Tony had designed a custom DVB-T video transmitter around using a specially modified KH6HTV model 70-9B, 10 watt 70cm amplifier, along with a Hi-Des modulator.

...

Part of their test was to evaluate various video receiving setups with different receivers and antennas. What they found worked best was the Hi-Des model UT-120, USB dongle, dual diversity receiver along with two different type antennas on the inputs. The best antenna combo for the diversity receiver was an M-Squared EggBeater antenna paired with a home-brew Helical antenna. (Editor's note: see our [Issue #174, Nov. 2024](#) for an article entitled "Evaluation of Hi-Des model UT-120 Dual-Diversity, USB, DVB-T, TV Tuner Dongle").

This is a Zero Retries Interesting article with some photos about putting "live streaming" video on an Amateur (not [tiny] model) rocket.

Share

Comments Summary From Previous Issue

Comments from Zero Retries 0227:

- Mesh on VHF / UHF "versus" repeaters - it's not entirely either / or.

To receive new issues of Zero Retries every week via email, become a free subscriber. To support Zero Retries, paid subscriptions are appreciated, *but entirely optional*.

Zero Retries Boilerplate

The [Zero Retries Store](#) is now open for business with quality Zero Retries branded merchandise and items being retired from Steve's N8GNJ Labs.

These bits were handcrafted (by a mere human, not an Artificial Intelligence bot) in beautiful Bellingham ([The City of Subdued Excitement](#)), Washington, USA, and linked to the Internet via [Starlink Satellite Internet Access](#).

See the **Zero Retries Boilerplate** page for significant acknowledgements and other information relevant to Zero Retries. For new readers of Zero Retries, that page, and the **About Zero Retries** page has useful information to check out.

My ongoing *Thanks* to:

Tina Stroh KD7WSF for, well, *everything!*

Jack Stroh, Late Night Assistant Editor Emeritus

Shrek Stroh, Late Night Assistant Editor In training

Annual Founding Members who generously support Zero Retries financially:

Founding Member 0000 - Steven Davidson K3FZT (Renewed 2025, 3rd year!)

Founding Member 0001 - Randy Smith WU2S (Renewed 2025, 3rd year!)

Founding Member 0002 - Chris Osburn KD7DVD (Renewed 2025, 3rd year!)

Founding Member 0003 - Don Rotolo N2IRZ (Renewed 2025, 3rd year!)

Founding Member 0004 - William Arcand W1WRA (Renewed 2025, 3rd year!)

Founding Member 0005 - Ben Kuhn KU0HN (Renewed 2025, 3rd year!)

Founding Member 0006 - Todd Willey KQ4FID (Renewed 2025, 3rd year!)

Founding Member 0007 and 0010 - Merik Karman VK1DF / VK2MKZ (Renewed 2025 x2, 3rd year!)

Founding Member 0008 - Prefers to Remain Anonymous 08 (Renewed 2025, 3rd year!)

Founding Member 0009 - Prefers to Remain Anonymous 19 (Renewed 2025, 2nd year!)

Founding Member 0011 - Rick Prelinger W6XBE (Renewed 2025, 2nd year!)

Founding Member 0012 - Ryan Tolboom N2BP (Renewed 2025, 2nd year!)

Founding Member 0013 - Newton White N4EWT (New 2025)

Founding Member 0014 - Joe Hamelin W7COM (New 2025)

Founding Member 0015 - Rich Stocking N7OP (New 2025)

Founding Member 0016 - Prefers to Remain Anonymous 77 (New 2025)

Founding Member 0017 - Phil Karn KA9Q (New 2025)

Founding Member 0018 - Prefers to Remain Anonymous 95 (New 2025)

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Keywords for this Issue

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44Net Cloud, 802.11ah, **Amateur Radio**, ARDC 44Net VPN, ARRL, CatSat, CEVROSAT-1, Cube Sat Simulator (CubeSatSim), **Data Communications**, Dave Ginsberg N3BKV, Digital Amateur Television (DATV), **Digital Communications**, **Digital Voice**, Dire Wolf, **DV**, FreeDV RADE, GNU Radio Conference (GRCon) 2026, **Ham Radio**, Inovato, M17, **N8GNJ**, OpenMANET, **Packet Radio**, **Radio Technology**, **Software Defined Radio**, **Software Defined Receiver**, Starlink Mini, **Steve Stroh**, Utah Digital Communications Conference, VA7ZEB.ca LOS, Wi-Fi HaLow, **Zero Retries**, **Zero Retries Digital Conference**, **ZRDC 2025**

*Keywords in **Bold** are regular mentions in each issue.*

Footnotes for this Issue

To see the relevant sentence for the footnote, just click the footnote number.

... which I have to continue to tutor on mundane points regarding queries about Amateur Radio. When I queried “what countries have the largest numbers of Amateur Radio Operators” ChatGPT 5.1 didn’t initially include China. When I asked why it had not included China in its response, it replied with the AI equivalent of “oops”.

2

Bundled below the “Announcements” link, not rating its own line... but The ARRL Solar Report did rate its own link at the top of the newsletter.

3

Just in case I misspoke or didn’t see it, did a text search of the PDF. **Data?** No mentions (the word occurs, just not in the context of radio technology). **Software Defined Radio / SDR?** No mention. **Digital?** No mention (the word occurs, just not in the context of radio technology). **AI?** No mention.

4

There’s an old joke about Amateur Radio that goes something like “If you ask five hams where they should meet to have coffee, you’ll get *ten* suggestions”. That joke is a humorous shorthand for the “wide diversity of opinions” in the worldwide activity of Amateur Radio.

5

Technically, I suppose, Digital Streaming Video could be transmitted on the unlicensed bands such as 902-928 MHz, 2.4 GHz, 5.x GHz, but the low transmit power levels there would make it really challenging.